Curriculum Under Autonomy

With effective from Academic Year 2023-2024

(R23)

Department: Electrical Engineering
Curriculum Structure & Syllabus
(Effective from 2023-24 admission batch)

1st Year 1st Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE101	Basic Electrical Engineering	3	0	0	3	3
2	ENGG	Minor	EC(EE)101	Analog and Digital Electronic Circuits	3	0	0	3	3
3	SCI	Multidisciplinary	M(EE)101	Engineering Mathematics – I	3	0	0	3	3
4	SCI	Multidisciplinary	PH(EE)101	Engineering Physics	3	0	0	3	3
5	SCI	Value Added Courses	HU104	Environmental Science	2	0	0	2	2
6	HUM	Value Added Courses	HU105	Indian Knowledge System	1	0	0	1	1
B. Practical									
7	ENGG	Major	EE191	Basic Electrical Engineering Laboratory	0	0	3	3	1.5
8	ENGG	Minor	EC(EE)191	Analog and Digital Electronic Circuits Laboratory	0	0	3	3	1.5
9	HUM	Ability Enhancement Courses	HU(EE)191	Technical Writing Skill	0	0	2	2	1
10	ENGG	Skill Enhancement Courses	PH(EE)191	Engineering Physics Laboratory	0	0	3	3	1.5
11	ENGG	Skill Enhancement Courses	ME(EE)191	Engineering Graphics and Design Laboratory	0	0	3	3	1.5
Total for Theory and Practical								**29**	**22**

1st Year 2nd Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE201	Electrical Circuit Analysis	3	0	0	3	3
2	SCI	Multidisciplinary	M(EE)201	Engineering Mathematics – II	3	0	0	3	3
3	SCI	Multidisciplinary	CH(EE)201	Engineering Chemistry	2	0	0	2	2
4	HUM	Ability Enhancement Courses	HU201	Professional Communication	2	0	0	2	2
5	HUM	Value Added Courses	HU202	Values and Ethics	2	0	0	2	2
6	HUM	Value Added Courses	HU203	Constitution of India	1	0	0	1	1
B. Practical									
7	ENGG	Major	EE291	Electrical Circuit Analysis Laboratory	0	0	3	3	1.5
8	HUM	Ability Enhancement Courses	HU291	Professional Communication Laboratory	0	0	2	2	1
9	SCI	Skill Enhancement Courses	CH(EE)291	Engineering Chemistry Laboratory	0	0	2	2	1
10	ENGG	Skill Enhancement Courses	ME(EE)291	Workshop and Manufacturing Practices Laboratory	0	0	3	3	1.5
Total for Theory and Practical								**23**	**18**

2nd Year 3rd Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE301	Electrical and Electronic Measurements	3	1	0	4	4
2	ENGG	Major	EE302	Signals and Systems	3	0	0	3	3
3	ENGG	Minor	EC(EE)301	Microprocessor and Microcontroller	2	0	0	2	2
4	ENGG	Minor	CS(EE)301	Programming for Problem Solving	2	0	0	2	2
5	HUM	Minor	HU(EE)301	Engineering Economics	2	0	0	2	2
B. Practical									
6	ENGG	Major	EE391	Electrical and Electronic Measurements Laboratory	0	0	2	2	1
7	ENGG	Major	EE392	Signals and Systems Laboratory	0	0	3	3	1.5
8	ENGG	Minor	EC(EE)391	Microprocessor and Microcontroller Laboratory	0	0	2	2	1
9	ENGG	Minor	CS(EE)391	Programming for Problem Solving Laboratory	0	0	2	2	1
10	HUM	Ability Enhancement Courses	HU(EE)391	Technical Presentation	0	0	2	2	1
Total for Theory and Practical								**24**	**18.5**

2nd Year 4th Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE401	Electrical Machines – I	3	0	0	3	3
2	ENGG	Major	EE402	Control Systems – I	3	0	0	3	3
3	ENGG	Major	EE403	Electromagnetic Field Theory	3	0	0	3	3
4	ENGG	Minor	EC(EE)401	Digital Signal Processing	2	0	0	2	2
5	ENGG	Minor	CS(EE)401	Data Structure and Algorithms	2	0	0	2	2
6	HUM	Ability Enhancement Courses	HU(EE)401	Principles of Management	2	0	0	2	2
B. Practical									
7	ENGG	Major	EE491	Electrical Machines – I Laboratory	0	0	3	3	1.5
8	ENGG	Major	EE492	Control Systems – I Laboratory	0	0	3	3	1.5
9	ENGG	Minor	EC(EE)491	Digital Signal Processing Laboratory	0	0	2	2	1
10	ENGG	Minor	CS(EE)491	Data Structure and Algorithms Laboratory	0	0	2	2	1
11	ENGG	Skill Enhancement Courses	ME(EE)491	Computer Aided Design	0	0	3	3	1.5
Total for Theory and Practical								**28**	**21.5**

3rd Year 5th Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE501	Electrical Machines – II	3	0	0	3	3
2	ENGG	Major	EE502	Power Systems – I	3	0	0	3	3
3	ENGG	Major	EE503	Power Electronics	3	0	0	3	3
4	ENGG	Major	EE504A	Renewable Energy – I	2	0	0	2	2
			EE504B	Embedded System Design					
			EE504C	Utilization of Electric Power					
5	ENGG	Minor	CS(EE)501A	Database Management System	2	0	0	2	2
			CS(EE)501B	Computer Network					
			CS(EE)501C	Sensors and IoT					
B. Practical									
6	ENGG	Major	EE591	Electrical Machines – II Laboratory	0	0	3	3	1.5
7	ENGG	Major	EE592	Power Systems – I Laboratory	0	0	3	3	1.5
8	ENGG	Major	EE593	Power Electronics Laboratory	0	0	3	3	1.5
9	ENGG	Skill Enhancement Courses	EE594	Electrical Workshop	0	0	2	2	1
10	ENGG	Skill Enhancement Courses	EE595	Dissertation on Design and Development – I	0	0	3	3	1.5
11	ENGG	Minor	CS(EE)591A	Database Management System Laboratory	0	0	3	3	1.5
			CS(EE)591B	Computer Network Laboratory					
			CS(EE)591C	Sensors and IoT Laboratory					
Total for Theory and Practical								**30**	**21.5**

3rd Year 6th Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE601	Electric Drives	3	0	0	3	3
2	ENGG	Major	EE602	Power Systems – II	3	0	0	3	3
3	ENGG	Major	EE603	PLC and Automation	2	0	0	2	2
4	ENGG	Major	EE604A	Line Commutated and Active Rectifiers	2	0	0	2	2
			EE604B	Energy Conservation and Audit					
			EE604C	Electrical Machine Design					
5	ENGG	Minor	CS(EE)601	Artificial Intelligence and Machine Learning	2	0	0	2	2
			ECS(EE)601	Bio-Medical Instrumentation					
			EC(EE)601	Analog and Digital Communication					
B. Practical									
6	ENGG	Major	EE691	Electric Drives Laboratory	0	0	3	3	1.5
7	ENGG	Major	EE692	Power Systems – II Laboratory	0	0	3	3	1.5
8	ENGG	Major	EE693	PLC and Automation Laboratory	0	0	2	2	1
9	ENGG	Skill Enhancement Courses	EE694	Dissertation on Design and Development - II	0	0	3	3	1.5
10	HUM	Ability Enhancement Courses	HU(EE)691	Soft Skill and Aptitude	0	0	2	2	1
11	PROJ	Internship*	EE681	Seminar on Industrial Training / Internship	0	0	0	0	2
Total for Theory and Practical								**25**	**20.5**

* Students have to complete Internship/Vocational Training at the Industry to earn Credit point subjected to appear in the Seminar and submission of Certificate(s).

4th Year 7th Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE701	Control Systems – II	3	0	0	3	3
2	ENGG	Major	EE702	Electric Vehicles	3	0	0	3	3
3	ENGG	Major	EE703A	Power Systems - III	2	0	0	2	2
			EE703B	Introduction to Smart Grid					
			EE703C	Power Quality					
4	ENGG	Major	EE704A	Distributed Generation and Microgrids	2	0	0	2	2
			EE704B	Electrical Machine Design					
			EE704C	HVDC Transmission Systems					
5	ENGG	Minor	CS(EE)701	Object Oriented Programming	3	0	0	3	3
			EC(EE)701A	Microelectronics and VLSI					
			EC(EE)701B	PCB Design and Manufacturing					
B. Practical									
6	ENGG	Major	EE791	Control Systems – II Laboratory	0	0	2	2	1
7	ENGG	Major	EE792	Electric Vehicles Laboratory	0	0	2	2	1
8	ENGG	Minor	CS(EE)791	Object Oriented Programming Laboratory	0	0	2	2	1
			EC(EE)791A	Microelectronics and VLSI Laboratory					
			EC(EE)791B	PCB Design and Manufacturing Laboratory					
9	PROJ	Project	EE781	Major Project – I	0	0	12	12	6
Total for Theory and Practical								**31**	**22**

4th Year 8th Semester									
Sl. No.	**Broad Category**	**Category**	**Paper Code**	**Subject**	**Contact Hours/Week**				**Credit Points**
					L	**T**	**P**	**Total**	
A. Theory									
1	ENGG	Major	EE801A	Renewable Energy – II	2	0	0	2	2
			EE801B	Restructured Power Systems					
			EE801C	Power System Operation and Control					
2	ENGG	Major	EE802A	Flexible AC Transmission Systems	2	0	0	2	2
			EE802B	Remote Sensing and GIS					
			EE802C	Robotics Engineering					
3	ENGG	Major	EE803A	Advanced Electric Drives	2	0	0	2	2
			EE803B	Illumination Engineering					
			EE803C	High Voltage Engineering					
4	ENGG	Minor	EC(EE)801	Digital Image Processing	3	0	0	3	3
			ME(EE)801	Power Plant Engineering					
			ECS(EE)801	Process Control					
B. Practical									
5	ENGG	Minor	EC(EE)891	Digital Image Processing Laboratory	0	0	2	2	1
			ME(EE)891	Power Plant Engineering Laboratory					
			ECS(EE)891	Process Control Laboratory					
6	ENGG	Major	EE881	Grand Viva	0	0	0	0	2
7	PROJ	Project	EE882	Major Project – II	0	0	12	12	6
Total for Theory and Practical								**23**	**18**

Credit Distribution

Category	1st Semester	2nd Semester	3rd Semester	4th Semester	5th Semester	6th Semester	Total Credit to obtain UG Degree (Category Wise)	Credit Allocation as per NEP to obtain UG Degree	7th Semester	8th Semester	Total Credit (Category Wise)	Credit Allocation as per NEP
Major (Core)	4.5	4.5	9.5	12	15.5	14	**60**	**60**	12	8	**80**	**80**
Minor Stream	4.5	-	8	6	3.5	2	**24**	**24**	4	4	**32**	**32**
Multidisciplinary	6	5	-	-	-	-	**11**	**9**	-	-	**11**	**9**
Ability Enhancement Courses (AEC)	1	3	1	2	-	1	**8**	**8**	-	-	**8**	**8**
Skill Enhancement Courses (SEC)	3	2.5	-	1.5	2.5	1.5	**11**	**9**	-	-	**11**	**9**
Value Added Courses common for all UG	3	3	-	-	-	-	**6**	**6 to 8**	-	-	**6**	**6 to 8**
Internship	-	-	-	-	-	2	**2**	**2 to 4**	-	-	**2**	**2 to 4**
Research Project	-	-	-	-	-	-	**-**	**-**	6	6	**12**	**12**
Total Credit (Semester Wise)	**22**	**18**	**18.5**	**21.5**	**20**	**22**	**122**	**120**	**20**	**20**	**162**	**160**

Distribution of Subjects under Different Categories

Major Courses

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Basic Electrical Engineering	EE101	1st	3:0:0	3
2.	Basic Electrical Engineering Laboratory	EE191	1st	0:0:3	1.5
3.	Electrical Circuit Analysis	EE201	2nd	3:0:0	3
4.	Electrical Circuit Analysis Laboratory	EE291	2nd	0:0:3	1.5
5.	Electrical and Electronic Measurements	EE301	3rd	3:1:0	4
6.	Signals and Systems	EE302	3rd	3:0:0	3
7.	Electrical and Electronic Measurements Laboratory	EE391	3rd	0:0:2	1
8.	Signals and Systems Laboratory	EE392	3rd	0:0:3	1.5
9.	Electrical Machines – I	EE401	4th	3:0:0	3
10.	Control Systems – I	EE402	4th	3:0:0	3
11.	Electromagnetic Field Theory	EE403	4th	3:0:0	3
12.	Electrical Machines – I Laboratory	EE491	4th	0:0:3	1.5
13.	Control Systems – I Laboratory	EE492	4th	0:0:3	1.5
14.	Electrical Machines – II	EE501	5th	3:0:0	3
15.	Power Systems – I	EE502	5th	3:0:0	3
16.	Power Electronics	EE503	5th	3:0:0	3
17.	Renewable Energy – I	EE504A	5th	2:0:0	2
	Embedded System Design	EE504B			
	Utilization of Electric Power	EE504C			
18.	Electrical Machines – II Laboratory	EE591	5th	0:0:3	1.5
19.	Power Systems – I Laboratory	EE592	5th	0:0:3	1.5
20.	Power Electronics Laboratory	EE593	5th	0:0:3	1.5
21.	Electric Drives	EE601	6th	3:0:0	3
22.	Power Systems – II	EE602	6th	3:0:0	3
23.	PLC and Automation	EE603	6th	2:0:0	2
24.	Line Commutated and Active Rectifiers	EE604A	6th	2:0:0	2
	Energy Conservation and Audit	EE604B			
	Electrical Machine Design	EE604C			
25.	Electric Drives Laboratory	EE691	6th	0:0:3	1.5
26.	Power Systems – II Laboratory	EE692	6th	0:0:3	1.5
27.	PLC and Automation Laboratory	EE693	6th	0:0:2	1
Total for Major Courses up to 3rd Year					**60**
28.	Control Systems – II	EE701	7th	3:0:0	3
29.	Electric Vehicles	EE702	7th	3:0:0	3
30.	Power Systems - III	EE703A	7th	2:0:0	2
	Introduction to Smart Grid	EE703B			
	Power Quality	EE703C			
31.	Distributed Generation and Microgrids	EE704A	7th	2:0:0	2
	Electrical Machine Design	EE704B			
	HVDC Transmission Systems	EE704C			
32.	Control Systems – II Laboratory	EE791	7th	0:0:2	1
33.	Electric Vehicles Laboratory	EE792	7th	0:0:2	1

Major Courses (Contd.)

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
34.	Renewable Energy – II	EE801A	8th	2:0:0	2
	Restructured Power Systems	EE801B			
	Power System Operation and Control	EE801C			
35.	Flexible AC Transmission Systems	EE802A	8th	2:0:0	2
	Remote Sensing and GIS	EE802B			
	Robotics Engineering	EE802C			
36.	Advanced Electric Drives	EE803A	8th	2:0:0	2
	Illumination Engineering	EE803B			
	High Voltage Engineering	EE803C			
37.	Grand Viva	EE881	8th	0:0:0	2
Total for Major Courses up to 4th Year					**80**

Minor Courses

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Analog and Digital Electronic Circuits	EC(EE)101	1st	3:0:0	3
2.	Analog and Digital Electronic Circuits Laboratory	EC(EE)191	1st	0:0:3	1.5
3.	Microprocessor and Microcontroller	EC(EE)301	3rd	2:0:0	2
4.	Programming for Problem Solving	CS(EE)301	3rd	2:0:0	2
5.	Engineering Economics	HU(EE)301	3rd	2:0:0	2
6.	Microprocessor and Microcontroller Laboratory	EC(EE)391	3rd	0:0:2	1
7.	Programming for Problem Solving Laboratory	CS(EE)391	3rd	0:0:2	1
8.	Digital Signal Processing	EC(EE)401	4th	2:0:0	2
9.	Data Structure and Algorithms	CS(EE)401	4th	2:0:0	2
10.	Digital Signal Processing Laboratory	EC(EE)491	4rd	0:0:2	1
11.	Data Structure and Algorithms Laboratory	CS(EE)491	4rd	0:0:2	1
12.	Database Management System	CS(EE)501A	5th	2:0:0	2
	Computer Network	CS(EE)501B			
	Sensors and IoT	CS(EE)501C			
13.	Database Management System Laboratory	CS(EE)591A	5th	0:0:3	1.5
	Computer Network Laboratory	CS(EE)591B			
	Sensors and IoT Laboratory	CS(EE)591C			
14.	Artificial Intelligence and Machine Learning	CS(EE)601	6th	2:0:0	2
	Bio-Medical Instrumentation	ECS(EE)601			
	Analog and Digital Communication	EC(EE)601			
Total for Minor Courses up to 3rd Year					**24**
15.	Object Oriented Programming	CS(EE)701	7th	3:0:0	3
	Microelectronics and VLSI	EC(EE)701A			
	PCB Design and Manufacturing	EC(EE)701B			
16.	Object Oriented Programming Laboratory	CS(EE)791	7th	0:0:2	1
	Microelectronics and VLSI Laboratory	EC(EE)791A			
	PCB Design and Manufacturing Laboratory	EC(EE)791B			

Minor Courses (Contd.)

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
17.	Digital Image Processing	EC(EE)801	8th	3:0:0	3
	Power Plant Engineering	ME(EE)801			
	Process Control	ECS(EE)801			
18.	Digital Image Processing Laboratory	EC(EE)891	8th	0:0:2	1
	Power Plant Engineering Laboratory	ME(EE)891			
	Process Control Laboratory	ECS(EE)891			
Total for Minor Courses up to 4th Year					**32**

Multidisciplinary Courses

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Engineering Mathematics – I	M(EE)101	1st	3:0:0	3
2.	Engineering Physics	PH(EE)101	1st	3:0:0	3
3.	Engineering Mathematics – II	M(EE)201	2nd	3:0:0	3
4.	Engineering Chemistry	CH(EE)201	2nd	2:0:0	2
Total for Multidisciplinary Courses up to 3rd Year/4th Year					**11**

Ability Enhancement Courses

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Technical Writing Skill	HU(EE)191	1st	0:0:2	1
2.	Professional Communication	HU201	2nd	2:0:0	2
3.	Professional Communication Laboratory	HU291	2nd	0:0:2	1
4.	Technical Presentation	HU(EE)391	3rd	0:0:2	1
5.	Principles of Management	HU(EE)401	4th	2:0:0	2
6.	Soft Skill and Aptitude	HU(EE)691	6th	0:0:2	1
Total for Ability Enhancement Courses up to 3rd Year/4th Year					**8**

Skill Enhancement Courses

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Engineering Physics Laboratory	PH(EE)191	1st	0:0:3	1.5
2.	Engineering Graphics and Design Laboratory	ME(EE)191	1st	0:0:3	1.5
3.	Engineering Chemistry Laboratory	CH(EE)291	2nd	0:0:2	1
4.	Workshop and Manufacturing Practices Laboratory	ME(EE)291	2nd	0:0:3	1.5
5.	Computer Aided Design	ME(EE)491	4th	0:0:3	1.5
6.	Electrical Workshop	EE594	5th	0:0:2	1

Skill Enhancement Courses (Contd.)

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
7.	Dissertation on Design and Development – I	EE595	5th	0:0:3	1.5
8.	Dissertation on Design and Development - II	EE694	6th	0:0:3	1.5
Total for Ability Enhancement Courses up to 3rd Year/4th Year					**11**

Value Added Courses

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Environmental Science	HU104	1st	2:0:0	2
2.	Indian Knowledge System	HU105	1st	1:0:0	1
3.	Values and Ethics	HU202	2nd	2:0:0	2
4.	Constitution of India	HU203	2nd	1:0:0	1
Total for Value Added Courses up to 3rd Year/4th Year					**6**

Internship

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Seminar on Industrial Training / Internship	EE681	6th	0:0:0	2
Total for Internship up to 3rd Year/4th Year					**2**

Research Project

Sl. No.	Name of the Subject	Subject Code	Semester	L:T:P	Credit
1.	Major Project – I	EE781	7th	0:0:12	6
2.	Major Project – II	EE882	8th	0:0:12	6
Total for Research Project for 4th Year					**12**

Recommended MOOCs courses for attaining the Honours for AICTE UG programmes as per MAKAUT

Dated: 05.08.2021

Massive Open Online Courses (MOOCs) scheme at MAKAUT, WB
(Applicable from the session 2020-21)

(Updated on 05.08.21)

All India Council for Technical Education (AICTE) has introduced Model Curriculum for Bachelor of Technology programme with 160 credits in the entire programme of 4 years, and additional 20 credits will be required to be achieved through Massive Open Online Courses (MOOCs) from different platform for the degree of Bachelor of Technology with Honours. These additional 20 credits will have to be acquired with online courses (MOOCs) as per AICTE. Students of B Tech program will have to complete additional 20 credits through MOOCs within 4 years of time. 16 credit points is applicable for 3 year UG programs. This creates an excellent opportunity for students to acquire the necessary additional skill set for employability through massive open online courses where the rare expertise of world famous experts from academics and industry are available. Maulana Abul Kalam Azad University of Technology, West Bengal (MAKAUT,WB) has thus decided to introduce AICTE model curriculum for its B.Tech Programmes and allow students to choose courses from any established online platform as per following revised guidelines from academic year 2020-21.

GUIDELINES FOR MOOCs

MOOCs (Massive Open Online Courses) have been inducted in University curriculum and academic activities in the following ways:

1. MOOCs for Honours Degree at Undergraduate Level
2. MOOCs for mandatory Coursework of Research Scholars for Ph.D. degree
3. MOOCs are also used for credit transfer as equivalent to theory courses of Curriculum under recommendation of BoS.
4. MOOCs for Mandatory Additional Requirements (MAR)

1 (A) MOOCs for B.Tech Honours Degree

For B.Tech Honours Degree, a B.Tech student will have to earn 20 credits from MOOCs from any established MOOCs platform addition to 160 credits for B.Tech degree.

The total of 20 credits that is required to attain eligibility for B.Tech Honours degree is distributed over four years in the following way:

1st year: 4-8 credits **2nd year: 4-8 credits**
3rd year: 4-8 credits **4th year: 4 credits**

A student of first year has to cover courses from at least three skills:

1. Computer Programing with Python /R
2. Soft skills
3. values and Ethics

Students of all streams are to be equipped with Programming skill in the language that is in high demand worldwide in the first year itself so that they can apply this skill in the subsequent semesters in their different areas including their core area of study.

Soft skill is very essential for grooming of the student and student must be exposed to it in the very

beginning of the 4 year long program.

Ethics is something that one should practice. Students are to be made aware of the ethics right in the beginning of the 4 year long program so that they can practice at least some of the ethical norms as applicable to Institutional environment and society, and be prepared to practice ethics in their working life.

All of the MOOCs courses are to be taken any MOOCs platform as per following scheme of credit points. There would not be any concept of fixed basket anymore. However, during choosing courses in the online platform students would essentially avoid the courses taught/offered through the curriculum in the offline / class room mode.

For NPTEL/Swayam platform: Credit points as specified in the platform
For other MOOCs platforms like Coursera, edX, Udemy, Simpilearn etc
Courses of 4 weeks to 7 weeks: 1 credit point
Courses of 8 weeks to 11 weeks: 2 credit point
Courses of 12 weeks to 15 weeks: 3 credit point
Courses of 16 weeks or more: 4 credit point
Where duration of MOOCs courses are available in hours
For every 8 hours of course: 1 credit point

However, for the courses with duration less than 8 hours, multiple courses could be taken together (preferably in the same area) to consider 1 credit point. But where duration is available in week, count of hours will not be applicable. The above structure is indicative only. And BoS/DC concerned may propose credit points of the courses offered through MOOCs platform based on the content and level beginner/ intermediate/ advanced) of the courses.

1 (B) MOOCs for B. Pharm Program

For B. Pharm Honours degree, **8 credits** will have to be obtained by students in addition to the credits specified for B.Pharm degree curriculum during entire period of 4 years. These credits have to be obtained through the MOOCs platforms.

1 (C) MOOCS for UG Architecture Degree

For B. Arch Honours degree, **8 credits** will have to be obtained by the students in addition to B. Arch Curriculum during entire period of 5 years from MOOCs platform.

1 (D) MOOCS for UG Architecture Degree

For Non-AICTE programs, a student will have to earn 16 credits from MOOCS in addition to 120 credits for UG degree.

The total of 16 credits that is required to attain eligibility for Honours degree is distributed over four years in the following way:

1st year: 4-8 credits **2nd year: 4-8 credits** **3rd year: 4 credits**

As mentioned earlier, Student has to cover courses in the first year:
MOOCs on R or Python Programming Language, MOOCs on Soft skill and MOOCs on Values & Ethics for the reason already mentioned.

The scheme of credit calculation would be same as mentioned above for different MOOCs platforms.

2. MOOCs for Research Scholars for Ph.D. degree

Research scholars have to take MOOCs as mandatory as a part of coursework for Ph.D. degree as per advice of the Research Supervisor. The credits for the course will be as per the assignment of credit for the course in the University website according to the length (in weeks) of the course, even if there is different credit assignment in the MOOCs platforms.

3. MOOCs for Credit Transfer

University had already introduced provision of credit transfer through MOOCs courses. Therefore, different courses of curriculum could be taken from MOOCs platform and credits could be transferred, if offered through online and credits are earned. However, to offer courses of curriculum through MOOCs platform like NETEL/SWAYAM/ Coursera/edX/Simplilearn etc, offering institute must get the course mapping (Mapping between the University course and that offered from the online platform) approved from the University for appropriate Credit Transfer Scheme.

If a student of the university is unable to attend a theory course due to attending internship or any other justified reason, the student may be allowed with special permission of the University to pursue equivalent MOOCs for against the theory course. However, content mapping to be completed preferably by BoS or appropriate authority is essential before opting the courses in MOOCs platform. More than one MOOCs courses may be necessary to be mapped to cover the syllabus of the theory course and the student has to complete all the MOOCs to cover the course. Credits earned in total in all the courses will be considered for equivalence and credit transfer.

Evaluation of the MOOCs course

Evaluation of the MOOCs courses would be done by the organization by whom it is being offered. In extraordinary circumstances, the modality of evaluation through certified personnel, online or offline, will be decided by the appropriate authority.

Uploading of MOOCs Data

Every Affiliated Institution has to upload the details of MOOCs data in respect of each student time to time in University's examinations portal and/or hard/soft copy as per instruction of the Controller of Examinations of the University. This is applicable for University's In-House Programs also.

4, MOOCs for Mandatory Additional Requirements (MAR)

MOOCs in MAR is provided for encouraging every student to enter in Digital Content form of Education from well-known Universities or organizations.

Students can choose any MOOCs course as per their interest area. There is no credit system for MOOCs in MAR as points could be earned as specified in the scheme and the MOOCs courses which are taken for earning credits for Honours degree will not be considered in MAR purpose.

The validity of uploaded certificates in the University portal is subject to acceptance of appropriate committee/expert review.

Colleges interested to deliver any course(s) online through MOOCs platform, should get vetted from the University regarding mapping of course for credit transfer/assessment process.

This notification supersedes all earlier instructions regarding MOOCs courses.

MOOC for First Year AICTE Programmes (Affiliated Colleges)

A. Category: Ethics

Course	Provider	Duration	Credits	Name of University / Institute	Status
Ethics in EngineeringPractice	NPTEL	8weeks	3	IIT Kharagpur	Active
A Life of Happinessand Fulfilment	Coursera	6 weeks	2	Indian School of Business	Active
Introduction toPhilosophy	Coursera	5 weeks	1	University of Edinburgh	Active
Ethical LeadershipThrough Giving Voice	Coursera	4 weeks	2	University of Virginia	Active

B. Category: Soft Skills

Course	Provider	Duration	Credits	Name of University / Institute	Status
Technical English for engineers	NPTEL	8 Weeks	3	IIT Madras	Active
Body Language: Key to Professional Success	NPTEL	4 Weeks	1	IIT Ropar	Active
Psychology at Work	Coursera	6 weeks	2	University of Western Australia	Active
Communication in the 21st Century Workplace	Coursera	4 weeks	1	University of California	Active
Successful Career Development	Coursera	7 weeks	2	University System of Georgia	Active
Working in Teams: A Practical Guide	edX	4 weeks	1	University of Queensland	Active
Communication theory: bridging academia and practice	Coursera	9 weeks	3	Higher School of Economics	Active
Write Professional Emails in English	Coursera	5 weeks	2	Georgia Institute of Technology	Active
Technical Writing	Coursera	5 weeks	1	Moscow Institute of Physics and Technology	Active
Interpersonal Communication for Engineering Leaders	Coursera	4 weeks	1	Rice University	Active

C. Category: Programming Skills

Course	Provider	Duration	Credits	Name of University / Institute	Status
Introduction to Programming with MATLAB	Coursera	9 weeks	3	Vanderbilt University	Active
Programming In C++	NPTEL	8 weeks	3	IIT Kharagpur	Active
Learn to Program: The Fundamentals	Coursera	7 weeks	2	University of Toronto	Active
Introduction to computer Science	Edx	4-5 weeks	2	Microsoft	Active
Introduction to Computer Science and Programming Using Python	Edx	Self Paced	4	MIT, USA	Active
Statistics and R	edX	Self Paced	4	Harvard University	Active
Introduction to Programming in C	Coursera	4 weeks	4	Duke University	Active
Java Programming: Solving Problems with Software	Coursera	4 weeks	4	Duke University	Active
Responsive Website Basics: Code with HTML, CSS, and JavaScript	Coursera	4 weeks	1	University of London Microsoft	Active
Introduction to HTML5	Coursera	3 weeks	1	University of Michigan	Active
HTML5 Coding Essentials and Best Practices	edX	6 weeks	2	W3C	Active
Problem solving through Programming In C	NPTEL	12 Weeks	4	IIT Kharagpur	Active
Joy of computing using Python	NPTEL	12 Weeks	4	IIT Ropar	Active
Programming, Data Structures and Algorithm Using Python	NPTEL	8 Weeks	3	CMI	Active
Foundation of Data Structures	edX	6 weeks	2	IIT Bombay	Active
Learn to Program: The Fundamentals	Coursera	7 weeks	3	University of Toronto	Active
Web Design for Everybody (Basics of Web Development and Coding) Specialization	Coursera	15weeks	4	University of Michigan	Active
Programming Basics	edX	9 weeks	3	IIT Bombay	Active

D. Category: Statistics

Course	Provider	Duration	Credits	Name of University / Institute	Status
Inferential Statistics	Coursera	7 weeks	2	University of Amsterdam	Active
Linear Regression and Modelling	Coursera	4 weeks	1	Duke University	Active

E. Category: Environmental Studies

Course	Provider	Duration	Credits	Name of University / Institute	Status
The Science of Well Being	Coursera	6 weeks	2	Yale University	Active
Ecology: Ecosystem Dynamics and Conservation	Coursera	5 weeks	1	American Museum of Natural History, Howard Hughes Medical Institute	Active
Effective Problem Solving and Decision Making	Coursera	4 weeks	1	University of California	Active
Moralities of Everyday Life	Coursera	6 weeks	2	Yale University	Active
Introduction to Logic	Coursera	10 weeks	3	Stanford University	Active
The Science of Everyday Thinking	edX	12 weeks	4	University of Queensland	Active
Digital Security and Human Rights	edx	3 weeks	1	Amnesty InternationalX	Active
Ethics in Engineering Practices	NPTEL	8 weeks	4		Active
Introduction to Philosophy: God, Knowledge, and Consciousness	edX	12 weeks	4	MIT	Active
Development of Sociology in India	NPTEL	4 Weeks	1	IIT Kanpur	Archived
Introduction to Logic	NPTEL	12 weeks	4	IIT Kanpur	Archived
Introduction to Problem-solving and Programming	NPTEL	12 weeks	4	IIT Kanpur	Archived
Speak English Professionally: In Person, Online & On the Phone	Course era	4 weeks	1	Georgia Tech	Active
Java Fundamentals for Android Development	edX	6 weeks	2	GalileoX	Active
Environmental Studies: A Global Perspective	edX	Self Paced	4	Curtin University	Active
Science, Technology and Society	NPTEL	12 weeks	4		Active
Critical Thinking &Problem Solving	edX	3 weeks	3	Rochester Institute of Technology	Active

List of MOOCs for UG Honours degree (AICTE Programmes)
Effective for Odd Semester of 2020-21
ELECTRICAL ENGINEERING

Course Name	Duration (Weeks)	Credit	Name of the Mooc websites	Availability of Course (Active/Inactive)
Fabrication Techniques for MEMs-based sensors: clinical Perspective	12	4	Swayam	Active
Introduction to computer vision with Watson and opencv	4	2	Coursera	Active
Solar Energy Basics	5	3	Coursera	Active
Introduction to the Internet of Things (IoT) and embedded system	4	2	Coursera	Active
IoT Networking and Fog Layer Devices	4	2	Edx	Active
Artificial Intelligence Search Methods For Problem Solving	12	4	Swayam	Active
Data Science for Engineers	8	3	Swayam	Active
Introduction to Machine Learning (IITM)	12	4	Swayam	Active
Python for Data Science	4	2	Swayam	Active
Introduction to cyber security	12	4	Swayam	Active
Statistics with Python Specialization	3	2	Coursera	Active
Artificial Intelligence (AI)	12	4	Edx	Active
Machine Learning with Python: from linear models to deep learning	15	4	Edx	Active
Deep learning and neural network for financial engineering	7	3	Edx	Active

Mandatory Additional Requirements (MAR) as per MAKAUT

Dated: 12.03.2019

Mandatory Additional Requirements for earning AICTE/non-AICTE UG Degree

In partial modification with the notice dated 11 June 2018 regarding Mandatory Additional Requirement (MAR) for earning UG degree, the following modifications/clarifications have been made, which would be effective from the present semester.

- Previously no division of activity points of MAR which are to be earned by the students, has been scheduled year wise. A student should acquire a total of minimum 100/75 activity points throughout 4 year/3 year curriculum which should be acquired by earning a minimum of 20 activity points and maximum of 30 activity points in each year of his/her study, which is necessary for uniform distribution of MAR activities throughout the entire period of the academic curriculum of the students.
- MAR activities for the students admitted up to the session 2018-19 and for the new session starting from 2019-20, will be in accordance with the following table.

Level of Entry in B.Tech Course	Total duration for earning Points	Minimum Points to be earned
1st Year starting from the academic year 2019-20 onwards	1st to 4th Year	100
2nd Year starting from the academic year 2019-20 onwards (Lateral Entry)	2nd to 4th Year	75

Table – I

Every student, who is admitted to the 4 years B.Tech program prior to the academic year 2019-20, is required to earn minimum number of Activity Points as per Table II in addition to the required academic grades, for getting MAKAUT, WB's B.Tech degree.

Current Semester	Total Minimum Number of Activity Points to be earned During the full course
2nd	100
4th	75
6th	50

Table –II

- The courses under MOOCs which have been already taken into consideration i.e., 20 credit courses for awarding B.Tech degree with Honours and 16 credit courses for non-AICTE courses are not to be considered again for awarding activity points for MAR.
- In addition to the existing activity point allotment for 12 weeks and 8 weeks MOOCs courses of short duration (4 weeks/2 weeks) can also be done. 10/5 activity points will be allotted, based on the short course duration of 4weeks/2 weeks respectively. The courses with duration ranging from 18-40 hours must also get proper weightage. (See the following table for details)

Weeks/Hours	Activity Points	Maximum Activity Points
12weeks/40hours	20	40
8weeks/30hours	16	
4weeks/20hours	10	
2weeks/10hours	5	

Table-III

- Any MOOCS already done or registered before the introduction of MAR system is not to be considered again for awarding activity points for MAR. Those courses should not be taken into consideration with retrospective effect.
- A student can also select MOOCs from the MOOCs basket/repository as designed by the University for earning activity points for MAR. But the same course cannot be counted for Honours. There should not be any overlapping of MOOCs with regard to MAR and Degree with Honours.
- If any student is unable to get certificate from MOOCs platform after auditing the course, the college will extend facility for awarding point after evaluation in consultation with the University.
- The activity points allotted per research publication (Vide Serial No.9 of Table-V) shall carry equal full weights among joint authors, if any, to encourage the students in research work.
- In addition to SWAYAM/NPTEL/Spoken Tutorial the names of all available MOOCs can be included. At present, SWAYAM/NPTEL/Spoken Tutorial have only been mentioned (Vide Serial No. 1 of Table V).
- In Serial No. 15 of Table-V, 'Student Chapter' should be read as 'Active Participation in Student Chapter', that is, whether the concerned student is an active member of the same.
- A student may earn activity point, being a member of other professional bodies and by participating as a resource person.
- A separate dedicated server is needed for huge data on students' evaluation on the part of the colleges. Digital versions of all certificates regarding MAR can be uploaded in the college.
- Every student should upload his/her MAR activity data/certificate in the social media, viz., Facebook/Instagram, which can be counted as part of the documentary evidence.
- Activities must be open-ended, that is, there can be many activities, other than the specified list by MAKAUT. College authorities may introduce new activities, with the prior approval of the University.
- The University has introduced new activities as part of MAR, which would encourage entrepreneurship ability of the students. Such activities are listed in the following table.

New MAR Activities (In addition to the existing list, Vide Serial No. 22, Table-V)

	Name of the Activity	**Points**	**Maximum Points Allowed**
	Self-Entrepreneurship Programme		
a)	To Organize Entrepreneurship Workshop and Programmes	10	20
b)	To take part in Entrepreneurship Workshop and get certificate	5	10
c)	Video Film-Making on Entrepreneurship	10	20
d)	Submit Business Plan on any Project	10	20
e)	To work for start-up/as entrepreneur	20	40

Table-IV

- There must be a Single Point of Contact (SPOC) in each college, who will keep correspondences with the University on MAR activities and his/her name is to be informed to the University. In addition, there should also be a nominated SPOC on behalf of the University for liaison with the colleges.

- Random sample visits and check-ups of individual institutes, as well as digital survey may be conducted from time to time to ensure proper implementation of MAR.
- The colleges should maintain MAR files for individual students, preferably in digital format, which can be inspected periodically by the University authorities.
- Different levels of activities in relief camps should carry different weightage for allotting activity points in MAR (Vide Serial No. 5 of Table-V).
- Institutions should not raise any subscription from the students in the name of MAR activities.

Notes:

1) Every student shall participate in the cio-curricular and extra-curricular activities and produce documentary proof to the designated Faculty Members appointed by the Head of the Department/Principal/Director in the respective college. Thereby the student should earn the required points before he/she appears for the Final Examinations.
2) A student's result of his/her Final Examinations will be withheld until he/she completes the minimum activity points by the end of his/her Degree Programme.
3) In every semester, every student is required to prepare a file containing documentary proofs of activities, done by him/her. This file will be duly verified and activity points will be assigned by the teachers as appointed above, at the end of every semester.
4) Each institution will form a three members committee, the composition of which is to be notified to the University. The committee will finalize the activity points for each student before entering them into the Online Point Entry System (at the URL, as specified by the COE of the University).
5) Every student has to earn at least 75, 100 or 125 activity points for 3, 4 or 5 year courses respectively. The points earned by the students will be reflected in their mark sheets.

Table V provides a List of Activity Heads and Sub-Activity Heads along with their capping of the activity points that can be earned by the students during the entire course duration.

Sl. No.	Name of the Activity	Points	Maximum Points Allowed
1.	MOOCs (SWAYAM, NPTEL, Spoken Tutorial, EdX, Coursera, etc.)	20 (per course)	40
2.	Tech Fest/Fest/Teachers' Day/Fresher's Welcome		
	a) Organizer	5	10
	b) Participant	3	6
3.	Rural Reporting	5	10
4.	Tree Plantation and up keeping (per tree)	1	10
5.	Participation in Relief Camps		
	a) Collection of funds/materials for the Relief Camp	5	40
	b) To be a part of the Relief Work team	20	
6.	Participation in Debate/Group Discussion/Tech Quiz/Quiz	10	20
7.	Publication of Wall Magazine in institutional level (magazine/article/internet)	10	20
8.	Publication in Newspaper, Magazine and Blogs	10	20
9.	Research Publication (per publication)	15	30
10.	Innovative Projects (other than course curriculum)	30	60

11.	Blood donation	8	16
	Blood donation camp organization	10	20
12.	Participation in Sports/Games		
	a) College level	5	10
	b) University level	10	20
	c) District level	12	24
	d) State level	15	30
	e) National/International Level	20	20
13.	Cultural Programme (Dance, Drama, Elocution, Music etc.)	10	20
14.	Member of Professional Society	10	20
15.	Student Chapter	10	20
16.	Relevant Industry Visit & Report	10	20
17.	Activities in different Clubs (Photography Club, Cine Club, Gitisansad)	5	10
18.	Participation in Yoga Camp (Certificate to be submitted)	5	10
19.	Adventure Sports with Certification	10	20
20.	Training to under-privileged/differently able	15	30
21.	Community Service & Allied Activities	10	20
22.	Self-Entrepreneurship Programme		
	a) To Organize Entrepreneurship Workshop and Programmes	10	20
	b) To take part in Entrepreneurship Workshop and get certificate	5	10
	c) Video Film-Making on Entrepreneurship	10	20
	d) Submit Business Plan on any Project	10	20
	e) To work for start-up/as entrepreneur	20	40

Table-V